

**REMARKS**

Claims 1-26 stand examined and are rejected on various grounds. After entry of the amendments, claims 1, 4-21, and 23-27 are pending. The objections and rejections are addressed in the appropriate sections below.

Independent claim 1 has been amended to incorporate the feature or features of its dependent claim 2, and claim 2 has been cancelled. Objected-to claim 3 has been cancelled and rewritten as independent claim 27.

The subject matter of amended claim 9 is discussed at paragraph 112 *inter alia*.

Independent claim 21 has been amended to incorporate the feature or features of its dependent claim 22, which claim was objected to in the Office Action for being dependent on a rejected claim but otherwise defining patentable subject matter. Claim 22 has been cancelled. Claim 23 has been rewritten to depend from pending claim 21 rather than from cancelled claim 22.

Independent claims 25 and 26 were rewritten to depend from independent claim 21. The subject matter of these claims is found at paragraphs 12 and 13 *inter alia*.

The amended claims therefore do not encompass any new matter within their scope.

In view of the preceding amendments and the remarks made herein, the present application is believed to be in condition for allowance.

**Drawing Objections:**

The Examiner has objected to the drawings as failing to comply with 37 C.F.R. § 1.84(p)(5) because they include the following reference sign(s) 400, 410, 412, 420, 422, 424, 426, 430, 432, and 818 not mentioned in the description.

Applicants have amended the drawings to remove the reference numbers and include new drawings to replace the previous set with this paper.

**35 U.S.C. § 112, Second Paragraph:**

Claim 9 stands rejected under 35 U.S.C. § 112, second paragraph for allegedly being indefinite as failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Office Action states that “the size of the indentations required and the specific meaning intended by ‘restrain’ are not sufficiently defined in this claim. It can be accurately stated that flow is restrained by frictional forces caused by microscopic indentations present in any channel, no matter how smooth it appears.”

Applicant has amended claim 9 to specify that the flow-restricting indentation(s) has or have a size sufficient to restrain free flow of a liquid through the microchannel. The specification in paragraph 112 for instance describes indentation(s) as having a size that prevents the free flow of a liquid, such that the liquid moves in discrete steps. A fluid interface moves freely in the channel until it encounters a flow-restricting indentation, at which point free flow of a liquid is restrained until a sufficiently high pressure is generated to overcome the restraint. Applicant submits that since the amended claim’s scope is clear, the amended claim is not indefinite and therefore complies with 35 U.S.C. Sec. 112 second paragraph.

**35 U.S.C. § 102(b):**

Claims 1, 4, 6, 12, 15, 21, 24, 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Auracher et al.

Independent claim 1 has been amended to claim the subject matter of claim 2. Independent claim 21 was amended to claim the subject matter of claim 22. Neither claim 2 nor claim 22 was rejected as anticipated by Auracher et al. Applicant submits that the rejection of

claims 1 and 21 should therefore be withdrawn. Claims 4, 6, 12, 15, 24, and 25 depend from one or the other of claims 1 and 21. Since a dependent claim cannot be anticipated where its independent claim is not anticipated, the rejection of claims 4, 6, 12, 15, 24, and 25 should likewise be withdrawn.

Claims 1, 12, and 26 stand rejected under 35 U.S.C. Sec. 102(b) as being anticipated by Batchelder.

Independent claim 1 has been amended to claim the subject matter of claim 2. Claim 2 was not rejected as anticipated by Batchelder, and therefore Applicant submits that the rejection of claim 1 should be withdrawn. Claim 12 depends from claim 1, and claim 26 as amended depends from claim 21. As claims 12 and 26 depend from independent claims that have not been found to be anticipated, Applicant submits that the rejection of claims 12 and 26 should be withdrawn.

**35 U.S.C. § 103(a):**

Claims 5, 7, 8, 9, 11, and 18-20 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious over Auracher et al. in view of Young. These claims all depend from claim 1, which in this Amendment has been amended to claim the subject matter of claim 2. The Office Action did not find the subject matter of claim 2 to be unpatentable under 35 U.S.C. Sec. 103(a) in view of this combination of references. Since claim 2 was not rendered unpatentable by this combination of references, dependent claims 5, 7, 8, 9, 11, and 18-20 that specify additional features to the subject matter of previous claim 2 are likewise not unpatentable under 35 U.S.C. Sec. 103(a).

Claim 2 (amended claim 1) and claim 10 stand rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Auracher et al. in view of Lee. The Office Action acknowledges explicitly for Auracher et al. and implicitly for Lee that neither Auracher et al. nor Lee discloses a device in which one resistive electrode with different potentials applied at both ends is present. The Office Action states that "Lee discloses a device of analogous function that utilizes two adjacent electrodes

... set at different potentials that function in the same way as a single resistive electrode with different potentials applied to the ends.”

Applicant respectfully traverses this rejection. References when combined must render the claimed subject matter, including all of its features as specified in the claim, obvious. Auracher et al. in view of Lee fails to disclose or suggest a pumping device in which one electrode is configured to permit two different potentials to be applied at ends of the electrode to act upon an interface between first and second fluids having different dielectric constants. If the rejection is based in common knowledge that a structure in this field that incorporates independent electrodes can be replaced with a structure that utilizes a single electrode capable of having two different potentials applied to its ends, Applicant respectfully requests that the Examiner provide a reference or declaration to that effect.

The Office Action also states that “Auracher et al. and Lee are analogous art in that both rely upon the controlled movement of dielectric fluids by varying the application of electric fields.” Applicant respectfully traverses this conclusion. To be analogous, a reference must be in the inventor’s field of endeavor or, if the field does not exist, in the field most closely associated with the inventor’s field. The field of endeavor includes the purpose to which a device is put. Lee is directed to a flat panel display incorporating a plurality of micro-pump light valves to form pixels for recreating an image. Lee’s technology is far afield from that of Auracher et al., which involves optical devices such as optical switches for use in telecommunications systems. A person of ordinary skill in optical telecommunications would not generally qualify as a person of ordinary skill in the field of flat-panel displays. In addition, the international classifications indicate that the feature common to Lee’s and Auracher et al.’s field of endeavor is physics, but otherwise the Auracher et al. patent and the Lee patent are found in disparate areas (G2 “optics” v. G9 “educating; cryptography; display; advertising; seals”).

Applicant therefore respectfully traverses the conclusion that Auracher et al. and Lee are analogous art.

The Office Action further states a conclusion that “it would have been obvious to one skilled in the art at the time of the invention to modify the use of the invention of Auracher et al. such that a gradient in electric field was used in the switching process, as taught by Lee, because this could result in more controlled switching, which might be desired in some instances.” For references to render an invention obvious, the references must lead a person of ordinary skill in the art to combine the references and derive subject matter within the scope of an examined claim. There must be a motivation, a clear compelling reason to make the combination. The reason stated in the Office Action for one of skill to combine the references is speculative, not compelling. As such, there is no motivation to combine the references.

As noted above, (1) the references when combined do not provide all features of the claimed subject matter; (2) there is additionally no motivation to combine the references that is apparent from the art; and (3) in addition, the references are far afield from one another. The cited references do not render the claimed subject matter unpatentable under 35 U.S.C. Sec. 103(a). In view of this, Applicant respectfully submits that the rejection of the subject matter of claim 2 (amended claim 1) be withdrawn. Claim 10 depends from amended claim 1, and therefore claim 10 is not unpatentable under 35 U.S.C. Sec. 103(a) for the reasons stated above.

Claim 13 was rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Batchelder in view of Pethig et al. Applicant notes that claim 2 (now amended claim 1) was not rejected as unpatentable in view of these references, and claim 13 depends from amended claim 1. In view of this, Applicant submits that the rejection of claim 13 should be withdrawn.

Claim 14 was rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Batchelder in view of Bjornson et al. Applicant notes that claim 2 (now amended claim 1) was not rejected as unpatentable in view of these references, and claim 14 depends from amended claim 1. In view of this, Applicant submits that the rejection of claim 14 should be withdrawn.

Claim 16 was rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Auracher et al. in view of Le Pesant et al. Applicant notes that claim 2 (now amended claim 1) was not

rejected as unpatentable in view of these references, and claim 16 depends from amended claim 1. In view of this, Applicant submits that the rejection of claim 16 should be withdrawn.

Claim 17 was rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Auracher et al. in view of Le.Pesant et al. as applied to claim 16 and further in view of Lee. As claim 17 depends from claim 16, claim 17 is patentable for the reasons stated above.

Applicant submits that the objections to claims 3, 22, and 23 have been addressed by the claim amendments and comments above.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 373722002600. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Dated: November 17, 2004

Respectfully submitted,

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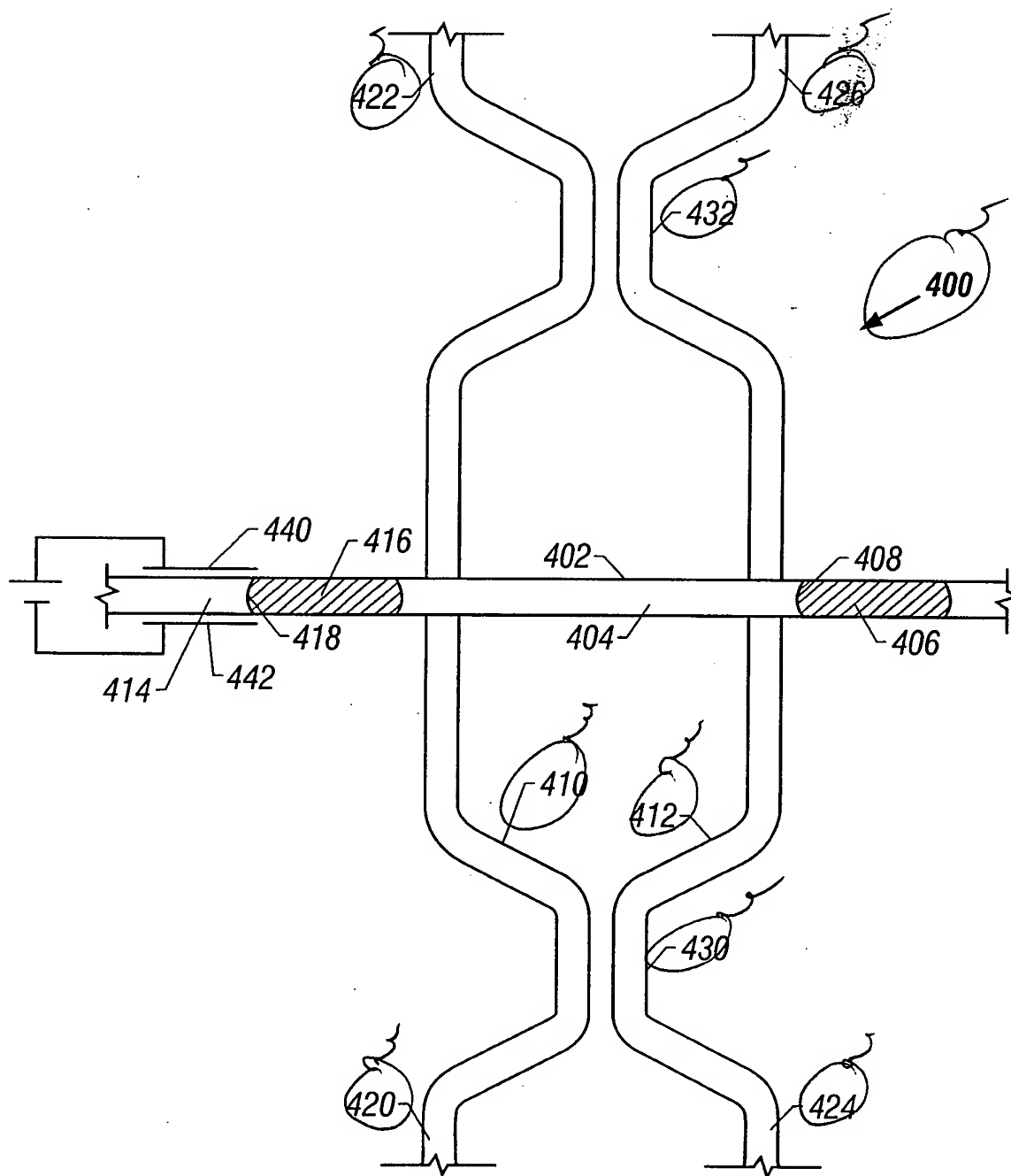
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**AMENDMENTS TO THE DRAWINGS**

The attached sheet(s) of drawings include changes to remove the numerical references from various figures that are not referred to in the specification.

Attachment:       Replacement sheet  
                      Annotated sheet showing changes

**FIG. 4**



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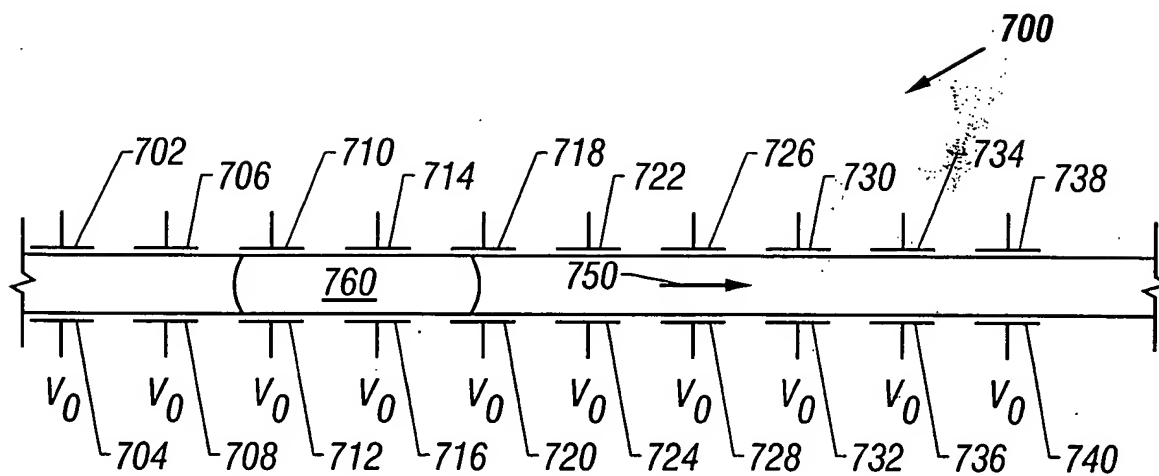


FIG. 7

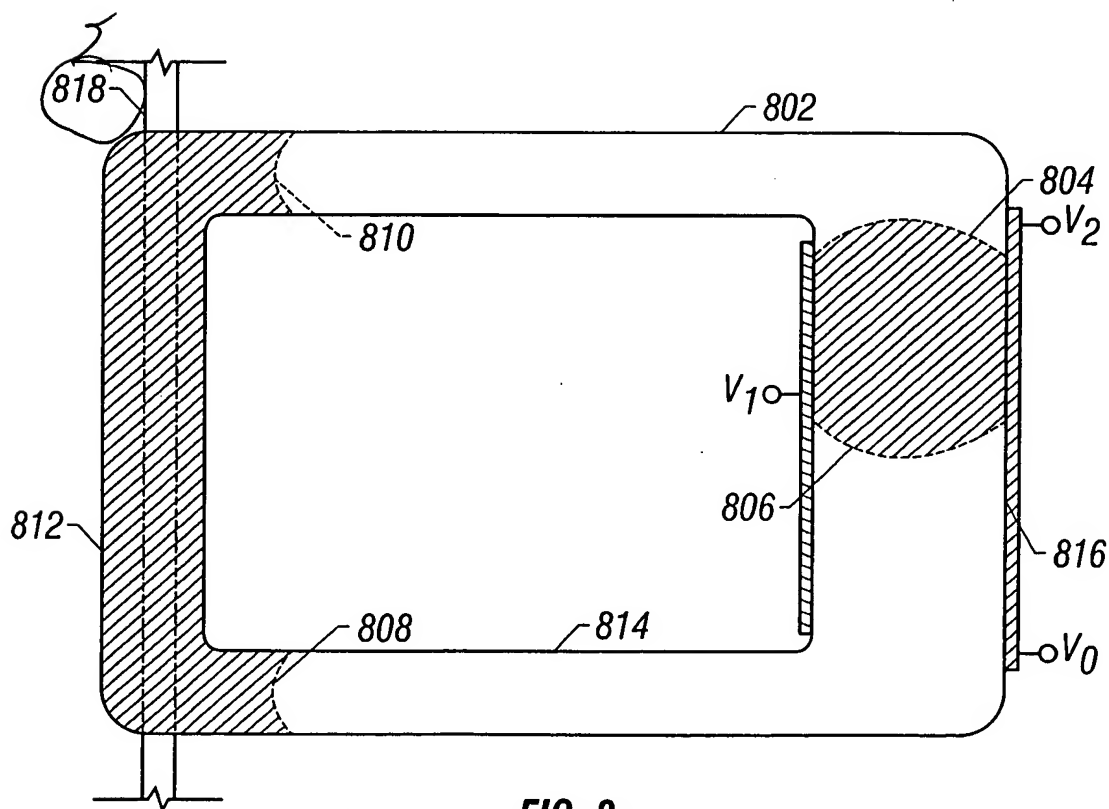
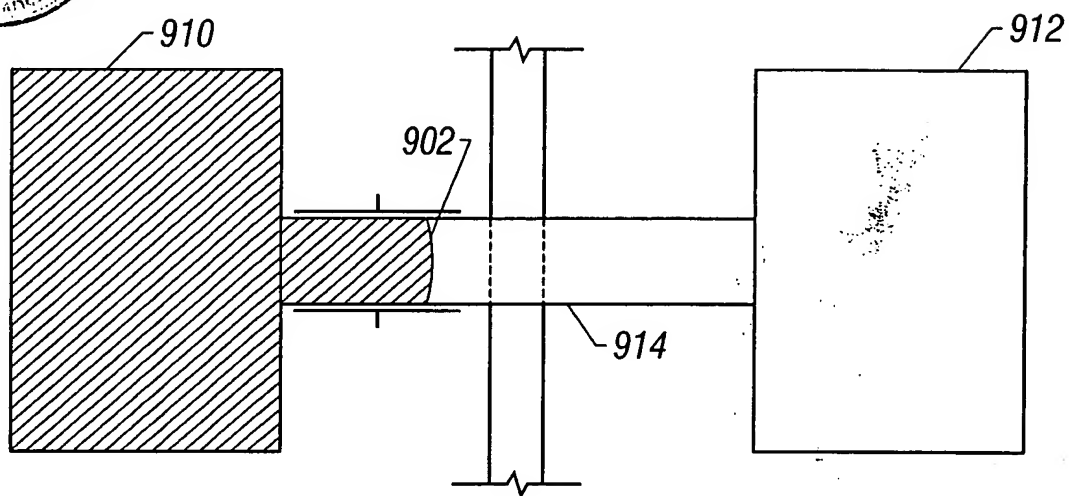


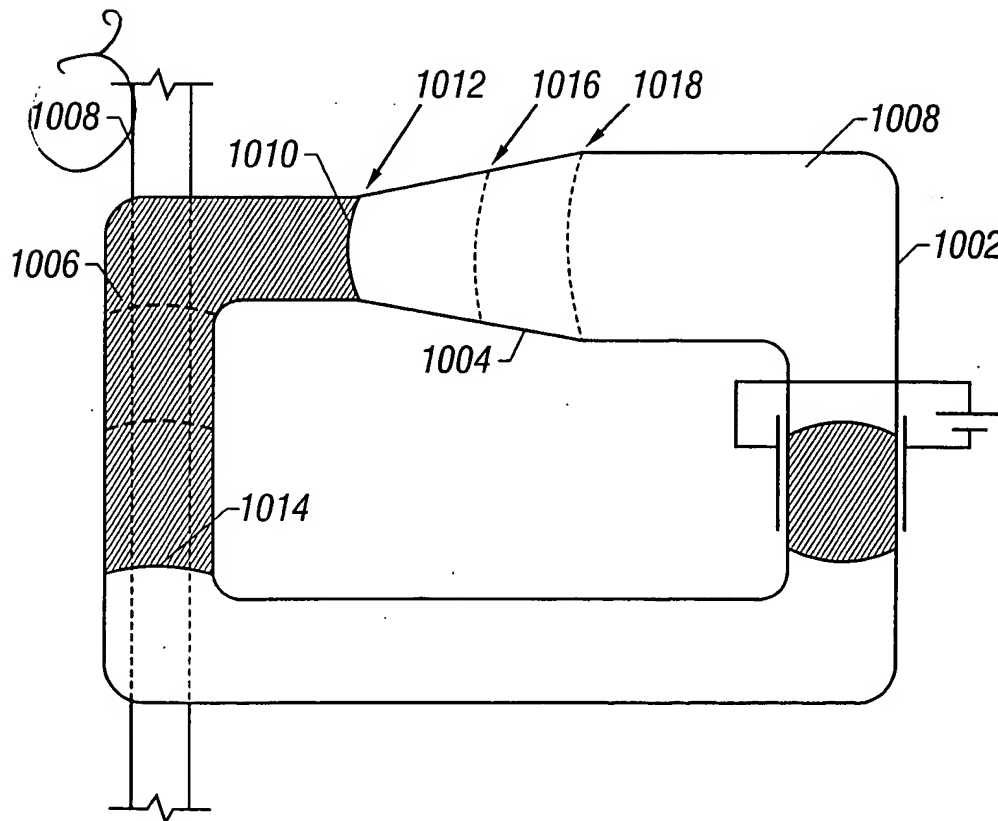
FIG. 8



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**FIG. 9**



**FIG. 10**